REMARKS

The Examiner is thanked for the Interview courteously granted to the undersigned, in connection with the above-identified application. During this Interview, differences between the previously claimed subject matter, including the coating film, and the references applied in the Office Action mailed June 3, 2011, were discussed, and also discussed were advantages achieved by the present invention due to these differences. During the Interview, the Examiner maintained her position that no weight would be given to the term "coating" in reciting the coating film, but that different issues arise in connection with reciting a "coated substrate". No agreement was reached during the Interview.

Applicants are amending their claims in light of discussions during the aforementioned Interview, and in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claim 1 to recite a coated substrate, which comprises a coating film on a substrate, the coating film being further defined (that is, the subject matter of claim 18 has been incorporated into claim 1). In light of amendments to claim 1, claim 18 has been cancelled without prejudice or disclaimer; and the dependent claims have been amended, in light of amendment of claim 1, to recite a coated substrate. In light of incorporation of subject matter of claim 18 into claim 1, with corresponding cancelling of claim 18, dependencies of claims 19 and 20 have been amended. Note that process claim 21 has been amended to recite a process for forming the coated substrate according to claim 1, including coating the coating composition on the substrate. Note corresponding amendments to process claims 22 and 23.

In addition, Applicants are adding new claims 25 and 26 to the application. Claims 25 and 26, each dependent on claim 1, respectively recites that the coating

film is provided directly in contact with the substrate (note, e.g., the paragraph bridging pages 15 and 16 of Applicants' specification); and further defines the substrate material, deleting "glass" and "quartz" from the listed materials of claim 20.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed June 3, 2011, that is, the teachings of the U.S. patents to Fuchs, No. 5,486,322, to Ishikawa, et al., No. 5,428,092, to Robertson, No. 4,477,366, to Lammerting, et al., No. 5,043,409, and to Dohi, et al., No. 4,235,654, and International (PCT) Published Application No. WO 02/083763, under the provisions of 35 USC 103.

In the following, No. WO 02/083763 will be discussed with reference to U.S. Patent No. 7,169,845 to Tamura, et al., which issued from a U.S. patent application which is a National Stage application of the PCT Application published as No. WO 02/083763.

It is respectfully submitted that the teachings of the references as applied by the Examiner in the Office Action mailed June 3, 2011, would have neither disclosed nor would have suggested the presently claimed coated substrate, comprising a coating film on a substrate, wherein the coating film is obtained by polymerizing and curing a coating composition including, in addition to specified amounts of a thiirane ring-containing compound having a specific structure and of a catalyst for accelerating polymerization of the thiirane ring-containing compound, the catalyst being selected from the group consisting of quaternary phosphonium salts, 0.005-4 parts by weight of a modified silicone oil selected from the group consisting of those of formulas (3)-(6) in claim 1, with this modified silicone oil having a wetting property in the coating composition with respect to the substrate, so as to increase

the wetting property of the coating composition to the substrate as compared to the wetting property of a composition of compound (A) and catalyst (B) and no compound (C). See claim 1.

As will be discussed in more detail infra, according to the present invention the compound (C) of specified amounts of the modified silicone oil, together with the recited amounts of the catalyst (B), increases the wetting property of the coating composition to the substrate, without disadvantageously affecting the transparency of the coated substrate. Such effect is opposite to, and contrasting with, the teachings of the secondary/tertiary references of Robertson, Lammerting, et al., Fuchs and Ishikawa, disclosing release agents from a mold, that is, agents which decrease adhesion of the materials being molded to the mold surfaces.

By using the combination of the specified thiirane ring-containing compound, catalyst for accelerating polymerization of the thiirane ring-containing compound, and modified silicone oil, with specified amounts of each, as in claim 1, the modified silicone oil acts unexpectedly as a wetting agent, so as to improve adhesion of the coating film to the substrate, without substantially affecting transparency.

As will be discussed in more detail infra, wetting property of the coating composition to the substrate is an important feature of the present invention, for providing a coated substrate with the coating which satisfactorily adheres to the substrate and has, for example, a desired coating thickness. Again, note that a wetting property, desired and achieved by the present invention, is diametrically opposed to a mold release property, wherein it is desired that there not be a "wetting" of the mold. According to the present invention, by using the specific modified silicone oils as in claimed for compound (C), in amounts as in the present claims, together with the other specified components of the coating composition and

amounts thereof, including the catalyst (B) selected from the group consisting of quaternary phosphonium salts, surprisingly a wetting property is obtained, achieving objectives according to the present invention.

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such coated substrate as in the present claims, wherein the coating film is provided directly in contact with the substrate. See claim 25.

Moreover, it is respectfully submitted that the references as applied by the Examiner would have neither disclosed nor would have suggested the coated substrate as discussed previously in connection with claim 1, in particular, wherein the substrate is made of a material as in claims 19, 20 and 26; and/or wherein this coating film is provided on a surface of an optical product, as in claim 7.

In addition, it is respectfully submitted that these references as applied by the Examiner would have neither disclosed nor would have suggested such a coated substrate as in the present claims, having features as discussed previously in connection with claim 1, and having further features as in additional dependent claims in the application, including (but not limited to) wherein the coating film provided on the substrate has a thickness as in claims 11-13; and/or wherein the coating composition utilized in forming the coating composition further includes a silane coupling agent (see claim 2), or wherein the coating film further includes an inorganic filler (see claim 14); and/or further definition of amount of the compound (C) in the coating composition, as in claims 16 and 17.

Moreover, it is respectfully submitted that the teachings of these applied references would have neither disclosed nor would have suggested such a process for forming a coated substrate as in the present claims, including wherein the coating

composition from which the coating film according to claims 1, 2 and 4, respectively, is obtained, is formed on the substrate (note claims 21-23).

The invention being claimed in the above-identified application is directed to a coated substrate, the coating film of the coated substrate being obtained by polymerizing and curing a composition including a thiirane ring-containing compound, processes of forming such coated substrate, and wherein such coated substrate forms an optical product.

As described in the paragraph bridging pages 1 and 2 of Applicants' specification, the present inventors have found novel sulfur-containing compounds having episulfide structures, and have developed transparent resins having a high refractive index. Such compounds have been disclosed as being cast into a mold, and then polymerized and cured to obtain a cured product thereof.

But there is a strong demand for incorporating the transparent resins in coating compositions, for coating various substrates.

However, since film materials made of the transparent resins generally exhibit a poor wetting property to various substrates, it is difficult to stably form a thin film coating having a thickness of from several μm to several tens μ, on a desired substrate. Note, for example, page 2, lines 5-8 of Applicants' specification.

As described in the last paragraph on page 2 of Applicants' specification, there have been proposed compositions composed of the thiirane ring-containing compound and a silane coupling agent; however, such silane coupling agents have been added in order to achieve proper molding, not to increase wetting of a substrate on which the coating film is formed. Note also the paragraph bridging pages 2 and 3 of Applicants' specification, describing other uses of thiirane ring-

containing compounds, including in coating films used for dental purposes, required to exhibit a high hiding property.

Against this background, it is still desired to provide a coated surface having a coating film with a high refractive index, little discoloration and having transparency, uniformity and adhesion property, formed from coating compositions having a high wetting property on the substrate.

As a result of extensive studies, Applicants have found that coating films formed by polymerizing and curing a coating composition as in the present claims exhibit a high refractive index, little discoloration and excellent transparency and uniformity. Moreover, Applicants have found that the coating composition utilized for forming the coating film exhibits a good wetting property on a substrate, wherein, for example, the coating composition includes the modified silicone oil and catalyst, in specified amounts, as recited in the present claims.

Tamura, et al. discloses a composition for resin suitable as a starting material for an optical material, the resin composition comprising an episulfide compound having, in one molecule, at least one epithio structure represented by Formula (2) at column 2, line 50 of this patent, and a polymerization regulator as in Formula (1) at column 2, line 60 of this patent and/or a halide (halogen-containing stabilizer) of a 13-16-group element of the long periodic table, a halogen compound of silicon, germanium, tin or antimony being particularly preferred. In column 28, lines 20-37, of this patent, it is disclosed that when the cured resin is difficult to release from molds after the polymerization, it is effective to use a known external or internal mold releasing agent, thereby improving the releasability from the molds of the cured material being formed, with examples of the internal mold releasing agent being given. See also column 3, line 50, through column 4, line 20, for disclosure of the

polymerization regulator; and column 4, line 23, through column 6, line 51, for disclosure of the halogen-containing stabilizer. See also column 27, lines 19-58, for disclosure of catalysts which can be included in the composition.

It is respectfully submitted that Tamura, et al. discloses a composition for an optical article itself. It is respectfully submitted that this patent does not disclose, nor would have suggested, a coated substrate as in the present claims, having a coating film on a substrate, in particular the coating film obtained using the coating composition as in the present claims, including component (C), and amount thereof, and wetting property of the coating composition to the substrate, due to the component (C) with the other components, and amounts of each.

Furthermore, it is respectfully submitted that this reference does not disclose, nor would have suggested, such coating film on the substrate, the coating film having been obtained by polymerizing and curing a coating composition including, inter alia, the specific catalyst (B), and the compound (C) which is a modified silicone oil selected from those with Formulas (3)-(6), in amounts of each, especially wherein this compound (C) has a wetting property in the coating composition with respect to the substrate, so as to increase the wetting property of the coating composition to the substrate as compared to the wetting property of a composition of compound (A) and catalyst (B) and no compound (C).

In particular, it is respectfully submitted that Tamura, et al. does not disclose that the composition therein includes a catalyst (B) selected from the group consisting of quaternary phosphonium salts, and modified silicone oil selected from the group consisting of formulas (3)-(6) of the present claims, with amounts of each as in the present claims, and advantages achieved thereby when used together with the specified thiirane ring-containing compound, as discussed in the foregoing.

As to contentions by the Examiner in the paragraph bridging pages 2 and 3 of the Office Action mailed June 3, 2011, note that all of the present claims recite the coated substrate, specific products formed by the coated substrate and a method of forming the coated substrate. The claims require the substrate. Accordingly, comments by the Examiner in connection with a free standing film are moot.

Applicants respectfully traverse the contention by the Examiner in the paragraph bridging pages 2 and 3 of the Office Action mailed June 3, 2011, that the film in Tamura, et al. applied to a glass or metal mold constitutes a "coated substrate" as in the present claims. That is, as can be appreciated by one of ordinary skill in the art, the mold in Tamura, et al. is used to form a molded body. It is respectfully submitted that the molded body inside the mold would not constitute a coated substrate as in the present claims, noting that the mold surfaces envelope the molded body within the mold.

The contention by the Examiner that "the film" in Tamura, et al. is applied to a glass or metal mold is respectfully traversed. That is, the composition of Tamura, et al. is filled into the interior of the mold, and has a known external or internal mold releasing agent for release of the cured material from the mold. It is respectfully submitted that the teachings of the molded body released from the mold would have taught away from the coated substrate of the present invention, in particular having the wetting property of the coating composition to the substrate, as recited in the present claims.

It is respectfully submitted that the teachings of the secondary references as applied together with the teachings of Tamura, et al. would not have rectified the deficiencies of Tamura, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Thus, Fuchs discloses a protective covering for human body members, the protective covering having an inner layer and outer layer, with a layer of protective solution (such as an antimicrobial solution) being disposed between the inner and outer layers, and an impermeable seal being provided between the layers to contain the protective solution therebetween. See column 2, lines 7-13. This patent also discloses in column 10, lines 29-59, a technique for forming a multi-layer glove, including use of a layer-forming solution which may comprise a release agent, preferred release agents including organosiloxane (i.e., silicone) compounds.

Ishikawa, et al. discloses a release agent comprising organosilicon compounds, the release agent composition comprising a mixture of a specified amino-functional diorganopolysiloxane and an amine-free dimethylsiloxane. See column 2, lines 45-56. See also column 2, lines 27-37. Note, further, column 4, lines 60 and 61; and column 5, lines 39-50, describing that the release agent composition is useful as release-improving additives for various thermosetting and thermoplastic resins, and organic rubbers.

Robertson discloses dispersions or blends of silicone compounds which act as superior internal mold release agents when added to reactive ingredients of polyurethane and polyurea forming resin systems, the blends being described most generally from column 2, line 64, through column 3, line 54. Note also column 6, lines 24-28, describing silicone surfactants used as dispersing agents and inhibitors for the described polysiloxane mold release agent to make polyisocyanate liquid dispersions. Note also column 8, lines 33-41, of this patent.

Lammerting, et al. discloses preparations of molded polyurethane and polyurea articles in the presence of a release agent, with the release agents being described most generally from column 3, line 55, through column 4, line 21.

It is emphasized that each of the secondary references used together with the teachings of Tamura, et al., discloses release agent compositions. In contrast, the modified silicone oil according to the present invention is used in order to enhance wetting properties, as recited in all of the present claims. That is, the present claims recite that the compound (C) has a wetting property in the coating composition with respect to the substrate, so as to increase the wetting property of the coating composition to the substrate as compared to the wetting property of a composition of compound (A) and catalyst (B) and no compound (C). Emphasizing that the secondary references disclose release agents, also disclosed in Tamura, et al. as applied by the Examiner, it is respectfully submitted that the disclosures of these applied references would have taught away from that aspect of the present invention wherein the compound (C) has a wetting property in the coating composition with respect to the substrate, so as to increase the wetting property of the coating composition to the substrate, and advantages achieved due thereto.

In other words, it is respectfully submitted that the presently claimed subject matter provides an unexpectedly better result of increased wetting property of the coating composition to the substrate, neither disclosed or suggested, and in fact taught away from, by the combined teachings of the applied references, as is clear from the foregoing.

That the presently claimed subject matter, including the component (C) which is the specified modified silicone oil, in amounts as in the present claims, achieves unexpectedly better results in wetting properties, can be seen in the Examples and Comparative Examples of Applicants' specification. Note, in particular, Tables 1-1 and 1-2 on page 19 of Applicants' specification. Thus, note that where an amount of modified silicone oil is added that is within the scope of the present claims, wetting

property and transparency are better than at least one of these properties in Comparative Examples 1-3. Note especially that even where some amount of modified silicone oil is included, either the wetting property or transparency is worse than such properties are in Examples 1-4. Such unexpectedly better results provide a basis for a conclusion of unobviousness of the presently claimed invention.

Dohi, et al. discloses a method of producing composite optical elements, wherein a glass substrate is treated with a silanating agent to activate the substrate with respect to an organic compound, laminating the activated glass substrate with a mold having a desired configuration through the intermediary of a clear organic prepolymer, and then bombarding the laminate with application of energy such as light, heat or radiation to cause the prepolymer to further polymerize, and, thereby, to form a thin layer of the cured organic compound on the glass substrate. See column 2, lines 20-35. Note column 3, line 58, through column 4, line 1, for examples of the silanating agent; and column 4, lines 8-14 and 42-51, for further description of the silanating agent. In column 5, lines 11-18, this patent discloses that to further assist in the release of the glass-organic polymer composite from the mold after the polymerization of the organic prepolymer, a mold release such as stearic acid may be previously incorporated into the organic prepolymer.

No. WO 02/083763 (with reference to Tamura, et al.), Fuchs, Ishikawa, et al., Robertson and Lammerting have previously been discussed.

Even assuming, arguendo, that the teachings of Dohi, et al. were properly combinable with the teachings of the other references as applied by the Examiner, it is respectfully submitted that the combined teachings of these applied references would have neither disclosed nor would have suggested such coated substrate, including the coating film obtained by polymerizing and curing the coating

composition including, in addition to the thiirane ring-containing, the specific catalyst and specified modified silicone oil, in amounts thereof as in the present claims, and advantages due thereto as in the present claims, including the wetting property with respect to the substrate.

In this regard, the evidence in Applicants' specification, discussed previously, shows unexpectedly better results achieved by the present invention, in improved wetting and transparency, even when taking the teachings of Dohi, et al. together with the teachings of Tamura, et al., Fuchs, Ishikawa, et al., Robertson and Lammerting.

Furthermore, it is emphasized that Dohi, et al. requires a separate silanating agent to activate the glass surface. This patent goes on to describe that after treatment with the silanating agent, an organic polymer material can then be applied to the activated surface. It is respectfully submitted that the teachings of Dohi, et al., either alone or in combination with the teachings of the other applied references, would have neither disclosed nor would have suggested the coating film being provided directly in contact with the substrate, as in claim 25; or wherein the substrate is made of a material as in claim 26, noting that glass is not included among the materials in claim 26, while Dohi, et al. requires a glass substrate.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently pending in the above-identified application are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Applicants request any shortage of fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry,

Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 396.45772X00), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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